WHAT IS CLAIMED IS:

1. A method of determining at least one characteristic of a tire selected from: the three components of a resultant of forces which are exerted by the road on the contact area of a tire, the self-alignment torque generated by the tire, the camber, and the pressure, the method comprising the steps of obtaining at least two measurements of circumferential extension or contraction in at least one sidewall of the tire at two fixed points in space, which points are situated at different azimuths along the circumference, and calculating said characteristic from said at least two measurements.

2. The method according to Claim 1, wherein the circumferential contraction or extension of the sidewalls is estimated by measuring the distance between the cords of the carcass ply in the sidewalls.

3. The method according to Claim 1, wherein the circumferential contraction or extension of the sidewalls is estimated by measuring the distance between wires forming a sensor which measures a variation in capacitance linked with the distance separating two electrodes.

4. The method according to Claim 1, wherein the measurement azimuths are selected to be symmetrical with respect to the azimuth of the center of the contact area (180°+α and 180°-α°), with α not equal to α_0, where α_0 is the azimuth at the entry of the contact area, V_1^1 and V_2^1 being the values measured at these azimuths on the first sidewall and V_1^2 and V_2^2 being the values measured at these azimuths on the second sidewall, an estimate of the component Fz is provided by $f_z(a_1V_1^1+a_2V_2^1+b_1V_1^2+b_2V_2^2)$, where a_1, a_2, b_1 and b_2 are positive real coefficients and f_z is a monotonic continuous function.

5. The method according to Claim 1, wherein the measurement azimuths are selected to be symmetrical with respect to the azimuth of the center of the contact area (180°+α and 180°-α°), with α not equal to α_0, where α_0 is the azimuth at the entry

of the contact area, V_1^1 and V_2^1 being the values measured at these azimuths on the first sidewall and V_1^2 and V_2^2 being the values measured at these azimuths on the second sidewall, an estimate of the component Fx is provided by $f_x(c_1V_1^1-c_2V_2^1+d_1V_1^2-d_2V_2^2)$, where c_1, c_2, d_1 and d_2 are positive real coefficients and f_x is a monotonic continuous function.

6. The method according to Claim 1, wherein the measurement azimuths are selected to be symmetrical with respect to the azimuth of the center of the contact area (180°+α and 180°-α°), with α not equal to α_0, where α_0 is the azimuth at the entry of the contact area, V_1^1 and V_2^1 being the values measured at these azimuths on the first sidewall and V_1^2 and V_2^2 being the values measured at these azimuths on the second sidewall, an estimate of the component Fy of the applied force is provided by $f_y(e_1V_1^1+e_2V_2^1-f_1V_1^2-f_2V_2^2)$, where e_1, e_2, f_1 and f_2 are positive real coefficients and f_y is a monotonic continuous function.

7. The method according to Claim 1, wherein the measurement azimuths are selected to be symmetrical with respect to the azimuth of the center of the contact area (180°+α and 180°-α°), with α not equal to α_0, where α_0 is the azimuth at the entry of the contact area, V_1^1 and V_2^1 being the values measured at these azimuths on the first sidewall and V_1^2 and V_2^2 being the values measured at these azimuths on the second sidewall, an estimate of the self-alignment torque N is provided by $f_n(g_1V_1^1-g_2V_2^1-h_1V_1^2+h_2V_2^2)$, where g_1, g_2, h_1 and h_2 are positive real coefficients and f_n is a monotonic continuous function.

8. The method according to Claim 1, wherein, the camber angle is estimated from a detected difference in load supported by each of the sidewalls on the basis of measurements of circumferential extension or contraction.

9. The method according to Claim 1, wherein tire pressure is estimated by obtaining measurements of circumferential extension or contraction and determining a contribution due to the pneumatic behavior separate from a contribution due to the structural behavior.

10. The method according to Claim 1, wherein at least three measurements of circumferential extension or contraction in a single sidewall of the tire are used.

11. The method according to Claim 1, wherein the measurement azimuths are selected to be symmetrical with respect to the azimuth of the center of the contact area ($180°+\alpha$ and $180°-\alpha°$), with α not equal to α_0, where α_0 is the azimuth at the entry of the contact area, and V_1 and V_2 being the values measured at these other azimuths, an estimate of Fx is provided by $f_x(r_2V_2-r_1V_1)$, where r_1 and r_2 are positive real coefficients and f_x is a monotonic continuous function.

12. The method according to Claim 1, wherein at least three fixed points in space are used, which points are defined such that:

    a first point corresponds to one of: the azimuth of the center of the contact area; and, the azimuth of the point opposite to the contact area;

    a second point and third point are symmetrically located with respect to a vertical plane passing through the center of the contact area.

13. The method according to Claim 12, wherein one azimuth corresponds to the middle of the contact area (azimuth 180°) and V_c is a value measured at this azimuth, the other measurement azimuths are selected to be symmetrical with respect to the azimuth of the center of the contact area ($180°+\alpha$ and $180°-\alpha°$), with α not equal to α_0, where α_0 is the azimuth at the entry of the contact area, and V_1 and V_2 being the values measured at these other azimuths, an estimate of Fz is provided by $f_z(s_cV_c-(s_1V_1+s_2V_2))$, where s_1, s_2 and s_c are positive real coefficients and f_z is a monotonic continuous function.

14. Method according to Claim 12, in which, one of the azimuths corresponding to the middle of the contact area (azimuth 180°) and V_c being the value measured at this azimuth, the other measurement azimuths being selected symmetrically with respect to the azimuth of the center of the contact area ($180°+\alpha$ and $180°-\alpha°$), with α not equal to α_0, where α_0 is the azimuth at the entry of the contact area, and V_1 and V_2

being the values measured at these other azimuths, an estimate of Fy is provided by $f_y(u_cV_c+u_1V_1+u_2V_2)$, where u_1, u_2 and u_c are positive real coefficients and f_y is a monotonic continuous function.

15. A method of determining at least one selected characteristic of a tire selected from: the three components of a resultant of forces which are exerted by the road on the contact area of a tire, the self-alignment torque generated by the tire, the camber, and the pressure, comprising the following steps:

determining measurement azimuths and collecting values of circumferential extension of at least one sidewall during varied stresses on the tire which stresses are selected so span a full range in which evaluation of the at least one selected characteristic will be permitted in normal use, the selected stresses giving rise to all the couplings liable to be encountered during normal use,

obtaining values of circumferential extension with a first measurement means and values of the at least one selected characteristic associated with circumferential extension with a second measurement means in order to form a training base,

determining coefficients of a transfer function to establish a link between the values of circumferential extension and the values of the at least one selected characteristic using the training base, and,

testing the transfer functions by comparing estimates of the at least one selected characteristic obtained by the transfer function with the values obtained by a direct measurement means.

16. The method of determination according to Claim 15, wherein the transfer function is a network having one layer of hidden neurons and one layer of output neurons.